U.S. Department of Energy

Tomorrow's Energy Today

for Cities and Counties

Saving at the Office: Dollars and Energy

Buying and using energy-efficient office equipment reaps economic and environmental benefits for local governments.

Office equipment is the fastest growing "consumer" of electricity in commercial buildings in the United States. The amount of electricity consumed by office equipment could increase as much as fivefold in the next decade, according to the American Council for an Energy-Efficient Economy (ACEEE). Today, this kind of equipment directly consumes about 30 billion kilowatt-hours per year, or about 5% of total commercial energy use, at a cost of $2.1 billion in electricity to businesses, according to the ACEEE. If the analysis included the cost of space conditioning to offset waste heat from office equipment, annual commercial electricity use would be about 40 billion kilowatt-hours.

This scenario offers city and county governments a huge opportunity for saving energy—and the money it costs to purchase that energy—with minimal effort. According to the Environmental Protection Agency (EPA), wide use of office equipment that earns EPA's Energy Star designation (see box on p. 2) could save enough electricity each year to power Vermont, New Hampshire, and Maine. The resulting reduction in carbon dioxide pollution would equal the emissions from 5 million autos. The savings to businesses would be about $1.7 billion in 1 year—roughly the amount of the Adolph Coors Beverage Company's annual sales.

Because they usually outnumber other office machines, personal computers use the largest portion of the energy consumed by the equipment in most U.S. offices. By using laptops, office staff members in Volusia County, Florida, save on their computer costs.

County of Volusia, Florida / PIX02237

Small Steps Equal Big Savings

The easiest way to save energy in an office is to continually educate employees about how they can help. Simply turning copiers off at night and on weekends can reduce energy use by about 65%. Turning personal computers off when they're not in use can reduce the amount of energy they consume by more than 75%. Energy-conscious workers can save most of this energy by simply turning off their computer monitors when they aren't using them.

Energy efficiency improvements in office equipment could reduce their electricity use by up to 70% in the short term and 90% in the long term.

For example, in New York City, a collaboration between American Express and Consolidated Edison Company of New York resulted in an informational brochure encouraging the 10,000 employees working in the American Express New York offices to turn computers off at night and on weekends. If all the employees follow through with the plan, the company would save $730,000 a year!

On an even grander scale, computer giant IBM estimates it saved $17.8 million worldwide in 1991 alone by encouraging employees to turn off equipment and lights when they're not in use. The company estimates that the effect of these energy efficiency programs is the same as if 50,000 cars were removed from the road, avoiding some 210,000 tons (190,000 metric tons) of carbon dioxide emissions.

The Energy Star Program

In 1992, the United States Environmental Protection Agency (EPA) announced its Energy Star program, which promotes the use of energy-efficient, power-managed office equipment as a way to increase profits and competitiveness and prevent pollution. The Energy Star program is a voluntary efficiency specification defined by the EPA that allows participating manufacturers to choose how best to meet it.

The first phase of the program addressed the energy consumption of personal computers. Manufacturers of personal computers and monitors that can be automatically powered down to 30 watts or less during periods of inactivity sign a voluntary agreement that entitles them to use a special Energy Star logo on labels and in promotional materials. EPA estimates that an Energy Star computer and monitor can save users from $20 to $90 per year in electricity bills.

In 1993, EPA announced the second phase of this program, which allows manufacturers to use the Energy Star logo on printers that enter a specified low power state after a period of inactivity.

In 1994, this part of the program expanded to include fax machines and combination printer/fax units.

In 1994, EPA also added retrofit power management equipment to the program, and in 1995, the Energy Star program began to include photocopiers. EPA has signed partnership agreements with manufacturers that sell 90% of all desktop computers and laser printers sold in the United States. In the first year of the program, 45% of personal computers and 85% of the printers sold in the United States received an Energy Star designation. The EPA estimates that, by the year 2000, widespread use of energy-wise computers could prevent carbon dioxide emissions of 20 million tons (18 million metric tons) annually—the equivalent of emissions from 5 million automobiles.

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Replacing Office Equipment in Volusia County

Many companies and local governments are writing criteria developed through EPA's Energy Star program into their purchasing policy agreements.

Ken Hayslette, Director of Purchasing in Volusia County, Florida, is just one enthusiastic supporter of the "Reduce, Reuse, and Recycle Procurement Policy Statement" that the Volusia County Council adopted in 1993.

As part of a county program to replace old equipment with more efficient Energy Star machines, Hayslette replaced 287 copiers ranging from 4 to 20 years old with new, energy-saving models. The new copiers feature automatic duplexing (copying on both sides of the paper) and a "sleep" mode that shuts them down when they are not in use. This was a critical step because copiers use more energy than any other individual piece of equipment in an office.

In terms of total energy use, however, personal computers are the hands-down winners, because there are so many more PCs than copiers. In Volusia County, the purchasing department has replaced about 100 old XT and AT personal computers with new, energy-efficient, Energy Star models. "In our department, all the new computer equipment we buy meets the EPA's Energy Star criteria for energy efficiency," Hayslette says.

The county's request for proposals for new office computers explicitly reserves the right to purchase products certified under the Energy Star program, regardless of price. "This stipulation is important, because all county departments work with 1-year budgets," Hayslette explains. "We don't use life-cycle costing when we purchase office equipment."

County of Volusia, Florida / PIX02236

New, energy-saving copiers feature automatic duplexing and shutdown when they're not being used. As part of a county-wide program, Volusia County replaced 287 copiers with energy-saving models.

IBM estimates it saved $17.8 million in 1991 by encouraging employees to turn off equipment and lights when they're not in use.

If they did perform a life-cycle cost analysis on their new machines, Volusia County managers would find that more efficient machines quickly recoup, in energy savings, the extra $100 or so that they cost. A study by researchers at Pacific Northwest Laboratory demonstrated simple paybacks of 1 to 2 years for the incremental costs of replacing obsolete or failed computers with Energy Star equipment.

Energy-Saving Purchasing Strategies

It is important for purchasers to understand the energy consumption patterns of the office equipment they purchase and use. One machine can use 10 times as much energy as another with similar features and reliability. For this reason, it makes sense to include energy efficiency as a criterion when purchasing office equipment. An easy way to obtain the most efficient equipment is to use the purchasing language developed through the Energy Star program.

Energy-efficient laser printers can operate on as little as a third of the energy that conventional laser printers consume. Direct thermal facsimile (fax) machines use almost 35% less energy than laser faxes do. And laptop computers consume 10% or less of the energy needed to power a desktop personal computer.

Although laser printers and fax machines produce higher quality products, ink-jet technologies are adequate for most applications. Some offices use ink-jet machines for most of their work and reserve one or two laser printers for applications that require the highest possible quality.

Most Energy Star equipment uses built-in power management hardware and software or external devices connected to the power supply that "put the unit to sleep" after a user-determined period of inactivity. A power-managed printer saves about $40 per year, and a power-managed fax machine saves about $20. You can also purchase and install reasonably priced power-management devices for your current equipment. This strategy is most cost-effective when the equipment is relatively new and running most of the time.

Comparing Equipment

Currently, test methods for comparing energy performance apply only to copiers. In the absence of test methods, procurement personnel can write Energy Star language into their purchasing policies. In its Energy Star program, EPA encourages the development and sale of energy-efficient, power-managed office equipment and publishes lists of Energy Star products.

Good information on energy consumed by office equipment is also available from other sources. For example, the ACEEE provides worksheets for calculating the savings resulting from using energy-efficient office equipment.

The Paper Issue

Paper has a large embodied energy content; making a virgin sheet of paper requires about 15 watt-hours of energy. This is far more energy than is needed to actually use the paper in a copier, printer, or fax machine. This embodied energy has become a concern in offices that are trying to reduce the environmental impact of their activities. One simple but highly effective step that your office staff can take is to change copier settings to duplex. This saves a substantial amount of paper—and money.

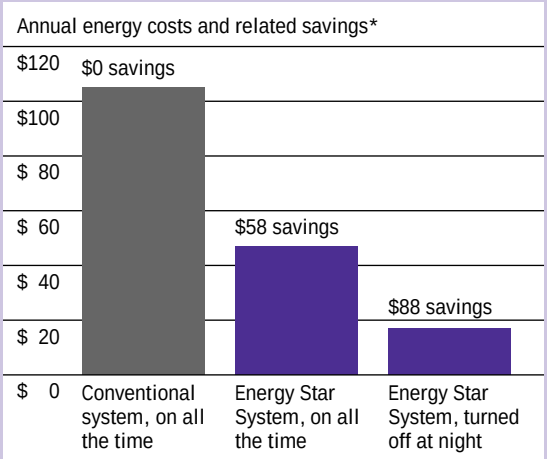
A Look to the Future

One promising new trend that will help to improve the energy efficiency of office equipment is to combine peripheral office equipment functions—printing, scanning, faxing, and copying—into one machine, commonly called a "hydra." Because so much energy is consumed by peripherals in "standby" mode, fewer machines in the office mean that less energy is consumed.

The power consumption of one manufacturer's hydra (an eight-page-per-minute laser printer/fax/scanner/copier) is rated at 40 watts in standby mode with a maximum of 300 watts when active—substantially less than the cumulative ratings of even the most efficient individual components. These machines accounted for only $750 million in sales in 1992, but the industry projects sales of more than $4 billion in 1996. Although the hydras produced in the early 1990s were either low in quality or high in cost, one manufacturer now offers a high-quality line of machines for $4,000 to $5,000, depending on print resolution. This amount is competitive with the total cost of separate components. At least one manufacturer now offers a combination ink-jet printer/copier/fax machine for about $1,000.

Local governments can make use of several of these methods to save energy and money. They can educate staff, buy more hydras, replace old equipment with new energy-efficient equipment, and use smart purchasing strategies. In an atmosphere of tight city and county budgets and increasing environmental concerns, improving the energy efficiency of office equipment is a simple way to save energy and dollars at the same time. ■

How Much Can Local Governments Save?



*Savings from Energy Star System compared with that of a typical computer and monitor left on all day and night, assuming 150 W at $0.08/kWh. Savings does not include heat gain from computer equipment.

Source: "Energy Star Computers," EPA,1995

An EPA Energy Star computer can save users money by going to sleep. Now, most computers and monitors on the market have this feature. This added functionality is invisible to the user, in terms of both performance and price—making it noticeable only by the Energy Star logo, and of course, the lower electricity bill.

For More Information

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Guide to Energy-Efficient Office Equipment (second edition)

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Cities and Counties on the Internet
Interested in more energy-saving ideas for your community? This fact sheet and others are available online. Go to the Energy Efficiency and Renewable Energy Network at http://www.eren.doe.gov, find the *Alphabetical Listing of All Sites,* and click on *Energy Solutions for Cities and Counties.*

This document was produced for the U.S. Department of Energy (DOE) by the National Renewable Energy Laboratory, a DOE national laboratory. The document was produced by the Technical Information Program, under the DOE Office of Energy Efficiency and Renewable Energy.

DOE/GO-10095-245
DE96000502
June 1996

Printed with a renewable-source ink on paper containing at least 50% wastepaper, including 20% postconsumer waste